

DMK 331P

Industrial Pressure Transmitter

Pressure Ports with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770:
0.5 % FSO



Nominal pressure

from 0 ... 60 bar up to 0 ... 400 bar

Output signals

2-wire: 4 ... 20 mA

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

Special characteristics

- ▶ suited for viscous and pasty media



Optional versions

- ▶ IS-version
Ex ia = intrinsically safe for gases and dusts
- ▶ SIL 2
according to IEC 61508 / IEC 61511
- ▶ food compatible filling fluid with FDA approval
- ▶ cooling element for media temperatures up to 300 °C
- ▶ customer specific versions


The pressure transmitter DMK 331P is suitable for measuring the pressure of viscous and pasty media, where a totally flush pressure port is required.

As on all industrial pressure transmitters made by BD|SENSORS, you may choose between various electrical and mechanical connections also on DMK 331P.

Preferred areas of use are

-  Plant and machine engineering
-  Food industry

Preferred used for

-  Viscous and pasty media



Input pressure range					
Nominal pressure gauge/abs. [bar]	60	100	160	250	400
Overpressure [bar]	100	200	400	400	600
Burst pressure \geq [bar]	180	300	500	750	1000

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / $V_S = 8 \dots 32 V_{DC}$	SIL-version: $V_S = 14 \dots 28 V_{DC}$
Option IS-protection	2-wire: 4 ... 20 mA / $V_S = 10 \dots 28 V_{DC}$	SIL-version: $V_S = 14 \dots 28 V_{DC}$
Options 3-wire	3-wire: 0 ... 20 mA / $V_S = 14 \dots 30 V_{DC}$ 0 ... 10 V / $V_S = 14 \dots 30 V_{DC}$	

Performance	
Accuracy ¹	$\leq \pm 0.5 \% \text{ FSO}$
Permissible load	current 2-wire: $R_{\max} = [(V_S - V_{S \min}) / 0.02 \text{ A}] \Omega$ current 3-wire: $R_{\max} = 500 \Omega$ voltage 3-wire: $R_{\min} = 10 \text{ k}\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / $\text{k}\Omega$
Long term stability	$\leq \pm 0.3 \% \text{ FSO} / \text{year}$ at reference conditions
Response time	2-wire: $\leq 10 \text{ msec}$ 3-wire: $\leq 3 \text{ msec}$

¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (offset and span) ²	
Thermal error	$\leq \pm 0.2 \% \text{ FSO} / 10 \text{ K}$
In compensated range	0 ... 85°C

² an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

Permissible temperatures		
Filling fluid	silicone oil	food compatible oil
Medium ³	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element ⁴	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C
Electronics / environment		-40 ... 85 °C
Storage		-40 ... 100 °C

³ max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C

⁴ max. temperature depends on the used sealing material, type of seal and installation

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability		
Vibration	20 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Filling fluids	
Standard	silicone oil
Options	food compatible oil (with FDA approval) (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

Materials		
Pressure port / housing	stainless steel 1.4404 (316 L)	
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 ... 8 mm)	
Seals	standard: FKM (recommended for medium temperatures $\leq 200 \text{ }^\circ\text{C}$) option: FFKM ⁵ (recommended for medium temperatures $< 260 \text{ }^\circ\text{C}$)	others on request
Diaphragm	stainless steel 1.4435 (316 L)	
Media wetted parts	pressure port, seals, diaphragm	

⁵ for pressure ranges $p_N \leq 100 \text{ bar}$

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-DMK 331P	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C_i \approx 0 \text{ nF}$, $L_i \approx 0 \text{ }\mu\text{H}$, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 $\mu\text{H}/\text{m}$

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Technical Data

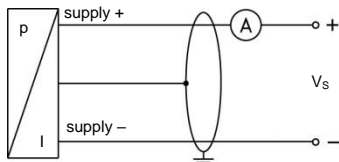
Miscellaneous	
Option SIL 2 version ⁶	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	min. 200 g (depending on process connection)
Installation position	any (standard calibration in a vertical position with the pressure port connection down)
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) ⁷
ATEX Directive	2014/34/EU

⁶ only for 4 ... 20 mA / 2-wire

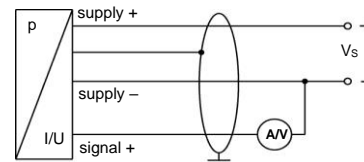
⁷ this directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagrams

2-wire-system (current)



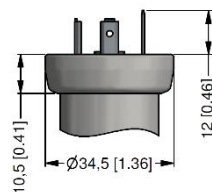
3-wire-system (current / voltage)



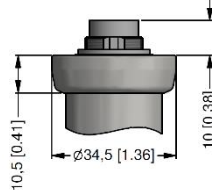
Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	compact field housing	cable colours (IEC 60757)
supply +	1	3	1	V _{S+}	WH (white)
supply -	2	4	2	V _{S-}	BN (brown)
signal + (only 3-wire)	3	1	3	S+	GN (green)
Shield	ground pin	5	4	GND	GNYE (green-yellow)

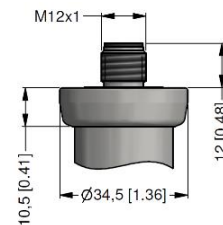
Electrical connections (dimensions mm / in)



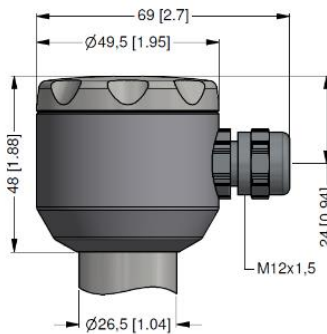
ISO 4400 (IP 65)



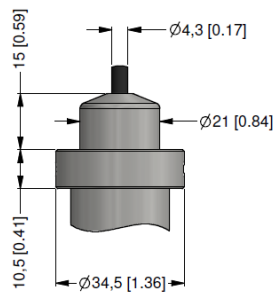
Binder series 723, 5-pin (IP 67)



M12x1, 4-pin (IP 67)



compact field housing (IP 67)



cable outlet with PVC-cable (IP 67) ⁸

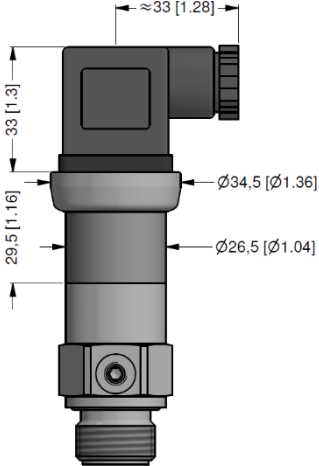
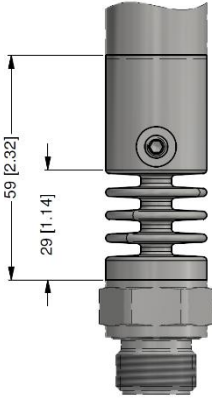
⇒ universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880) and other versions on request

⁸ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)

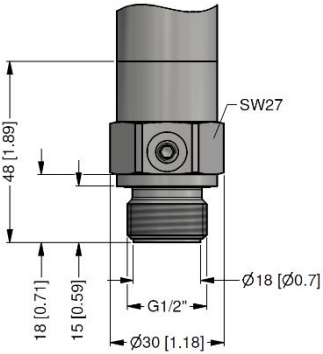
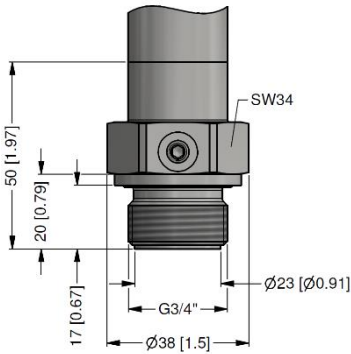
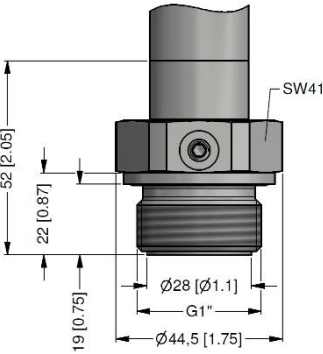
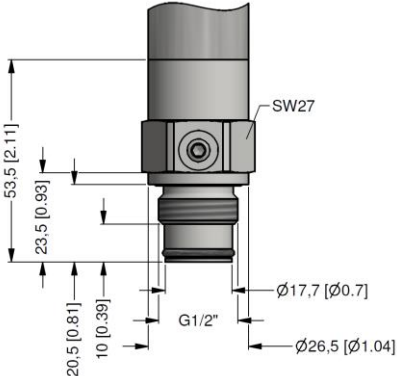
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Dimensions (mm / in)	cooling element up to 300 °C ⁴ (optionally)
	 <p data-bbox="1027 741 1235 763">possible for p_N ≤ 160 bar</p>

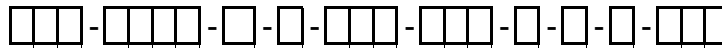
⁴ max. temperature depends on the used sealing material, type of seal and installation

Mechanical connections (dimensions mm / in)	
 <p data-bbox="389 1328 564 1350">G1/2" flush DIN 3852</p>	 <p data-bbox="1043 1328 1219 1350">G3/4" flush DIN 3852</p>
 <p data-bbox="397 1839 564 1861">G1" flush DIN 3852</p>	 <p data-bbox="1059 1839 1203 1883">G1/2" flush with radial o-ring</p>
<p data-bbox="464 1939 1011 1984">⇒ SIL- and SIL-Ex version: total length increases by 26.5 mm! ⇒ metric threads and other versions on request</p>	

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Ordering code DMK 331P

DMK 331P



Pressure									
gauge	5	0	5						
absolute	5	0	6						
Input [bar]									
60	6	0	0	2					
100	1	0	0	3					
160	1	6	0	3					
250	2	5	0	3					
400	4	0	0	3					
customer	9	9	9	9					consult
Output									
4 ... 20 mA / 2-wire					1				
0 ... 20 mA / 3-wire					2				
0 ... 10 V / 3-wire					3				
intrinsic safety 4 ... 20 mA / 2-wire					E				
SIL2 4 ... 20 mA / 2-wire					1S				
SIL2 with intrinsic safety 4 ... 20 mA / 2-wire					ES				
customer					9				consult
Accuracy									
0.5 % FSO					5				
customer					9				consult
Electrical connection									
male and female plug ISO 4400					1	0	0		
male plug Binder series 723 (5-pin)					2	0	0		
cable outlet with PVC-cable (IP67) ¹					T	A	0		
male plug M12x1 (4-pin) / metal					M	1	0		
compact field housing					8	5	0		
stainless steel 1.4301 (304)					9	9	9		
customer									consult
Mechanical connection									
G1/2" DIN 3852 with flush diaphragm					Z	0	0		
G3/4" DIN 3852 with flush diaphragm					Z	S	0		
G1" DIN 3852 with flush diaphragm					Z	S	1		
G 1/2" DIN 3852 with rad. o-ring and flush diaphragm					Z	6	1		
customer					9	9	9		consult
Diaphragm									
stainless steel 1.4435 (316L)							1		
customer							9		consult
Seals									
FKM							1		
FFKM ²							7		
customer							9		consult
Filling fluids									
silicone oil							1		
food compatible oil							2		
customer							9		consult
Special version									
standard							0	0	0
with cooling element up to 300°C ³							2	0	0
customer							9	9	9
									consult

¹ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request

² only for $p_N \leq 100$ bar possible

³ only for $p_N \leq 160$ bar possible